

Methods of Reducing fish Losses In Irrigation Diversions!



Montana
Fish and Game
Department

Introduction

For many years the Fish and Game Department and sportsmen of Montana have considered the problem of fish losses in irrigation diversions as a serious drain on the fish population of this state. However, little was known of the extent of this loss and even less was known of a practical method of reducing this waste.

In order to check the nature and extent of fish losses, an investigation project was undertaken in 1950 in the Gallatin valley and was continued through 1952.

As a result of research on this project, it was found that the cumulative loss of all irrigation diversions in a drainage was large. However the loss to an individual ditch would not warrant the expenditure required to install fish screens.

This study revealed certain practices in water manipulation and ditch management which will, if followed, reduce the loss of trout materially.

These are presented in this pamphlet for the use of ranchers, sportsmen and fishery managers.

By William Clothier

Illustrations — Vernon Craig

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Methods of Reducing Fish Losses In Irrigation Diversions

Almost every person concerned with sport fisheries resources has thought "How can fish losses to irrigation diversions be reduced?"

The solution invariably seemed to hinge on fish screens or salvaging operations. But these proposals are not the answer. As early as 1903 State Warden W. F. Scott reported that screens were

impractical because of spring and fall leaves (Forest and Stream, February 14, 1903).

Many experimental installations have since been tested by the Montana Fisheries Division and in 1942 it was concluded that annual maintenance alone for a statewide screening program would cost three times as much money as was available for the operation of the entire Fisheries Division (Montana Fish and Game Commission, Biennial Report, 1941-42).

Fish salvage is equally impractical because the high cost of crews and equipment does not permit the wide application necessary to effect an appreciable reduction of the overall loss.

Recent investigations conducted by the Department in Gallatin



SCREENING IS EXPENSIVE

Valley show that other remedial measures do exist which should be put into immediate practice.

Proper headgate manipulation can be expected to save as much as 35 percent or more of the pounds of trout lost to individual ditches. This was demonstrated in the Low Line Canal in 1951 when 36.87 pounds of game fish were stimulated to move back into the West Gallatin River by severe water reductions.

Others have observed this phenomenon and it has not been entirely overlooked with respect to saving fish lost to irrigation ditches.

Dr. Richard B. Miller states, "There now exists a sort of agreement (in Alberta) whereby headgates are shut slowly." (Correspondence, 1951.)

Gallatin Valley studies during the 1952 irrigation season substantiated previous findings. Trout marked in the 4,850 foot area behind the headgate of the Middle Creek Supply Canal and the first 7,500 feet of the Kleinschmidt Canal, 100 percent of the recaptures were found from 950



to 7500 feet upstream from the point of release.

A third canal (Spain-Ferris) served as a control, and its water supply was turned off abruptly without a preliminary period of decreased flow. Over 65 percent of the marked recaptures in this ditch were either in the vicinity where marked or found downstream from the point of release.

Apparently water removal exposes fish and stimulates movement. Most of the fish so stimulated travel in an up-canal direction until they reach the river or find cover in the form of pools, undercut banks, or heavy overhanging brush. Fish travel greater distances whenever a uniformly smooth channel bottom and a minimum of cover exists.

On the basis of these observations, it is recommended that all ditch companies reduce the flow in ditches abruptly three days prior to headgate closure in the fall. This three-day period is based on the time it took the maximum number of fish to move out of the Low Line Canal.

Shorter reduction periods are beneficial and can be applied anytime conditions favor decreased flow during the irrigation season. The amount of decreased flow will depend primarily on the opening under the headgates. This opening should be not less than three inches high.

If this spacing does not reduce the flow to the lowest level capable of supporting fish movement, a narrow high opening should be created by either modifying the construction of the headgate or

blocking part of the flow into the canal with baled straw, boards or other suitable material.

A greater number of fish can be saved by filling in holes and removing excessive brush cover. This is especially important for the area immediately behind the headgate.

It is of little benefit to stimulate fish to move one or two thousand yards up a canal only to have them find suitable concealment just short of the river. A project of cover removal can be accomplished through the cooperative efforts of both sportsmen and ditch companies.

Many ditches have two headgates—one at the point of diversion and the other some distance down the canal. The downstream headgate regulates the flow into the canal proper and surplus water at this point is bypassed back to the river through a blowoff.

Wherever this condition exists, a third measure to reduce fish losses can be applied. If the upstream headgate and by-pass are opened one or two weeks prior to the irrigation season, some resident fish in the



vicinity of the intake structure can be transferred from the intake back to the river downstream from the point of diversion.

This proposal is based on the finding that approximately 80 percent of the pounds of trout and

whitefish lost to the Keughen Canal in 1950 moved down the ditch during the high water period, and an even greater percentage (96 percent) was lost to the Low Line Canal in 1951 under similar conditions.

